

WHAT IS CLAIMED IS:

1. A fuel composition comprising:

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5 (a) a major amount of an internal combustion engine hydrocarbon fuel containing at least one alcohol, it being provided that methyl tertiary-butyl ether is substantially absent from the fuel; and,

(b) a friction modifying amount of a reaction product of at least one natural or synthetic oil and at least one alkanolamine.

10 2. The fuel composition of Claim 1 wherein the hydrocarbon fuel is selected from the group consisting of gasoline, diesel, kerosene and jet fuels.

15 3. The fuel composition of Claim 1 wherein the alcohol is selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, t-butanol, pentanol, hexanol, heptanol, octanol, nonanol, decanol, undecanol, dodecanol, tridecanol, tetradecanol, pentadecanol, phenol and mixtures thereof.

4. The fuel composition of Claim 1 wherein the alcohol is present in the hydrocarbon fuel in an amount of less than about 25 percent by volume.

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5. The fuel composition of Claim 1 wherein the natural oil is a C<sub>6</sub>-C<sub>22</sub> fatty acid ester.

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cont

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6. The fuel composition of Claim 1 wherein the natural oil is selected from the group consisting of beef tallow oil, lard oil, palm oil, castor oil, cottonseed oil, corn oil, peanut oil, soybean oil, sunflower oil, olive oil, whale oil, menhaden oil, sardine oil, coconut oil, palm kernel oil, babassu oil, rape oil and soya oil.

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7. The fuel composition of Claim 1 wherein the alkanolamine is selected from the group consisting of monoethanolamine, diethanolamine, propanolamine, isopropanolamine, dipropanolamine, di-isopropanolamine, butanolamines, aminoethylaminoethanol and mixtures thereof.

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8. The fuel composition of Claim 1 wherein the weight ratio of natural or synthetic oil to alkanolamine is from about 0.2 to about 3.

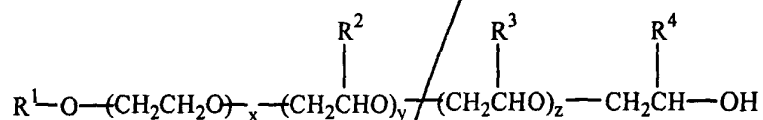
9. The fuel composition of Claim 1 wherein the friction modifying amount of the reaction product of component (b) present in the fuel composition is from about 0.1 to about 1000 PTB.

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10. The fuel composition of Claim 1 further comprising a carrier.

11. The fuel composition of Claim 10 wherein the carrier is a liquid carrier selected from the group consisting of substituted polyethers, cyclic polyethers aromatic polyethers and polyether alcohols.

12. The fuel composition of Claim 11 wherein the polyether alcohol possesses the general formula



wherein x is an integer from 0 to about 5, y is an integer from 1 to about 49 preferably from about 5 to about 40 and more preferably from about 5 to about 10, z is an integer from 1 to about 49, preferably from about 5 to about 40 and more preferably from about 5 to about 10 and the sum of x + y + z is equal to 3 to about 50; R<sup>1</sup> is an alkyl, an alicyclic or an alkylalicyclic radical having from about 4 to about 30 carbon atoms or an alkylaryl where the alkyl group is from about 4 to about 30 carbon atoms; R<sup>2</sup> and R<sup>3</sup> each is different and is an alkyl group of from 1 to 4 carbon atoms and each oxyalkylene radical can be any combination of repeating oxyalkylene units to form random or block copolymers; and R<sup>4</sup> is the same as R<sup>2</sup> and R<sup>3</sup>.

13. The fuel composition of Claim 12 wherein the polyether alcohol is a mixture of 2-(4-n-nonyl (poly(propylene oxide-co-butylene oxide) phenylether)-1-n-propyl alcohol and 2-(4-n-nonyl(poly(propylene oxide-co-butylene oxide) phenylether)-1-n-butyl alcohol.

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14. The fuel composition of Claim 10 wherein the amount of the carrier present in the fuel additive composition is from about 10 to about 1000 PTB.

15. The fuel composition of Claim 1 further comprising at least one fuel detergent.

5 16. The fuel composition of Claim 15 wherein the fuel detergent is selected from the group consisting of Mannich base detergents, polyetheramines, polyolefin-amines, polyolefin-polyamines, polyolefin-phenol-polyamines, polyolefin succinimides and mixtures thereof.

Sub 103 17. A method of operating an internal combustion engine which comprises operating the engine employing as a fuel therefor a fuel composition which comprises:

(a) a major amount of an internal combustion engine hydrocarbon fuel containing at least one alcohol, it being provided that methyl tertiary-butyl ether is substantially absent from the fuel; and,

15 (b) a friction modifying amount of a reaction product of at least one natural or synthetic oil and an alkanolamine.

18. The method of Claim 17 wherein the hydrocarbon fuel is selected from the group consisting of gasoline, diesel, kerosene and jet fuels.

19. The method of Claim 17 wherein the alcohol is selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, t-butanol, pentanol, hexanol, heptanol, octanol, nonanol, decanol, undecanol, dodecanol, tridecanol, tetradecanol, pentadecanol, phenol and mixtures thereof.

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20. The method of Claim 17 wherein the alcohol is added to the hydrocarbon fuel in an amount of less than about 25 percent by volume.

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21. The method of Claim 17 wherein the natural oil is a C<sub>6</sub>-C<sub>22</sub> fatty acid ester.

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22. The method of Claim 17 wherein the natural oil is selected from the group consisting of beef tallow oil, lard oil, palm oil, castor oil, cottonseed oil, corn oil, peanut oil, soybean oil, sunflower oil, olive oil, whale oil, menhaden oil, sardine oil, coconut oil, palm kernel oil, babassu oil, rape oil and soya oil.

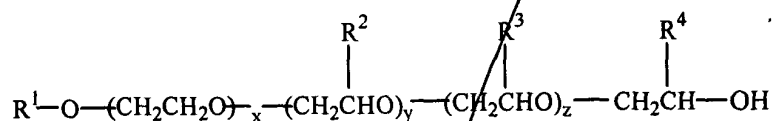
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23. The method of Claim 17 wherein the alkanolamine is selected from the group consisting of monoethanolamine, diethanolamine, propanolamine, isopropanolamine, dipropanolamine, di-isopropanolamine, butanolamines, aminoethylaminoethanol and mixtures thereof.

24. The method of Claim 17 wherein the weight ratio of natural or synthetic oil to alkanolamine is from about 0.2 to about 3.

5 25. The method of Claim 17 wherein the fuel composition further comprises a carrier.

Sub B1 7 26. The method of Claim 25 wherein the carrier is a polyether alcohol of the general formula



15 20 wherein x is an integer from 0 to about 5, y is an integer from 1 to about 49 preferably from about 5 to about 40 and more preferably from about 5 to about 10, z is an integer from 1 to about 49, preferably from about 5 to about 40 and more preferably from about 5 to about 10 and the sum of x + y + z is equal to 3 to about 50; R<sup>1</sup> is an alkyl, an alicyclic or an alkylalicyclic radical having from about 4 to about 30 carbon atoms or an alkylaryl where the alkyl group is from about 4 to about 30 carbon atoms; R<sup>2</sup> and R<sup>3</sup> each is different and is an alkyl group of from 1 to 4 carbon atoms and each oxyalkylene radical can be any combination of repeating oxyalkylene units to form random or block copolymers; and R<sup>4</sup> is the same as R<sup>2</sup> and R<sup>3</sup>.

27. The method of Claim 25 wherein the amount of the carrier present in the fuel composition is from about 10 to about 1000 PTB.

5 28. The method of Claim 17 wherein the fuel composition further comprises at least one fuel detergent.

10 29. The method of Claim 28 wherein the fuel detergent is selected from the group consisting of Mannich base detergents, polyetheramines, polyolefin-amines, polyolefin-polyamines, polyolefin-phenol-polyamines, polyolefin succinimides and mixtures thereof.

15 *sub. CS 7* 30. A method of reducing friction in an internal combustion engine comprising the step of adding to the engine a fuel composition comprising:

(a) a major amount of an internal combustion engine hydrocarbon fuel containing at least one alcohol, it being provided that methyl tertiary-butyl ether is substantially absent from the fuel; and,

(b) a friction modifying amount of a reaction product of at least one natural or synthetic oil and at least one alkanolamine.

20 31. The method of Claim 30 wherein the hydrocarbon fuel is selected from the group consisting of gasoline, diesel, kerosene and jet fuels.

32. The method of Claim 30 wherein the alcohol is selected from the group consisting of methanol, ethanol, propanol, isopropanol, butanol, t-butanol, pentanol, hexanol, heptanol, octanol, nonanol, decanol, undecanol, dodecanol, tridecanol, tetradecanol, pentadecanol, phenol and mixtures thereof.

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33. The method of Claim 30 wherein the alcohol is added to the hydrocarbon fuel in an amount of less than about 25 percent by volume.

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ester.

34. The method of Claim 30 wherein the natural oil is a C<sub>6</sub>-C<sub>22</sub> fatty acid

35. The method of Claim 30 wherein the natural oil is selected from the group consisting of beef tallow oil, lard oil, palm oil, castor oil, cottonseed oil, corn oil, peanut oil, soybean oil, sunflower oil, olive oil, whale oil, menhaden oil, sardine oil, coconut oil, palm kernel oil, babassu oil, rape oil and soya oil.

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36. The method of Claim 30 wherein the alkanolamine is selected from the group consisting of monoethanolamine, diethanolamine, propanolamine, isopropanolamine, dipropanolamine, di-isopropanolamine, butanolamines, aminoethylaminoethanol and mixtures thereof.

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